

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 23

UNITED STATES PATENT AND TRADEMARK OFFICE

MAILED

JAN 29 1996

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BOARD OF PATENT APPEALS
AND INTERFERENCES

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ROLAND G. MILLER

Appeal No. 95-1332
Application 08/009,430¹

ON BRIEF

Before KRASS, CARDILLO, and BARRETT, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the final rejection of claims 10 and 13. Claims 1-9, 11, and 12 have been cancelled.

¹ Application for patent filed January 27, 1993, entitled "Display Arrangement," which is a continuation of Application 07/695,171, filed May 3, 1991, now abandoned.

Appeal No. 95-1332
Application 08/009,430

The invention is directed to liquid crystal display (LCD) backlighted by a number of yellow light emitting diodes (LEDs), with a particular LCD control arrangement.

Claim 10, the sole independent claim, is reproduced below.

10. A display system comprising:

- a multi-character segmented liquid crystal display (LCD) panel;

- a smoke screen diffuser fixably mounted to the rear of the LCD panel;

- a plurality of electrically interconnected yellow light emitting diodes (LED);

- a first constant current power source in direct series communication with light emitting diodes;

- a circuit board having said light LEDs mounted to one side of said circuit board, said circuit board being fixably mounted to said rear of the LCD panel such that said LEDs are in spaced relation to said smoke screen diffuser to define an enclosed convity [sic, cavity];

- control means in electrical communication with each of said character segments of said liquid crystal display for selectively actuating a character segment to cause said character segment to illuminate representative of a character, wherein said control mean includes:

- a plurality of display drivers, each of said drivers being in electrical communication with one or more of said respective character segments of said LCD;

- a second power supply in electrical communication with each of said display drivers;

- decoder/multiplexer having a plurality of output pins, respective ones of said output pins in electrical communication with a respective one of said display drivers; and,

- a microcontroller having;

Appeal No. 95-1332
Application 08/009,430

a serial data output pin in electrical communication with each of said display drivers;

a clock pulse output pin in electrical communication with each of said display drivers; and,

a plurality of output terminals in electrical communication with respective input terminals of said decoder/multiplexer.

THE REFERENCES

The examiner relies upon admitted prior art in the specification and the following U.S. patents:

Schwarzchild et al. (Schwarzchild)	3,863,436	February 4, 1975
Bournay, Jr. et al. (Bournay)	4,573,766	March 4, 1986
Arai	4,748,444	May 31, 1988
Anglin ²	5,030,943	July 9, 1991 ²

THE REJECTION

Claims 10 and 13 stand rejected under 35 U.S.C. § 103 as being unpatentable over Bournay, Schwarzchild, Arai, Anglin, and admitted prior art in the specification.

We refer to the Examiner's Answer (Paper No. 22) for the details of the examiner's rejection.

OPINION

We reverse the examiner's rejection.

Claims 10 and 13 are grouped to stand or fall together (Brief, page 2).

² Effective filing date November 23, 1988.

Appeal No. 95-1332
Application 08/009,430

Bournay discloses an LED backlighting panel 20 for a conventional multi-character segmented LCD module 28. The panel 20 is "a thin rectangular panel of light transmitting material having a flat front surface" (column 3, lines 24-25) with "a light diffusing surface area on said front surface of said panel" (column 3, lines 27-28). The light diffusing area 46 "is textured or roughened, such as by sanding" (column 4, lines 26-27) to scatter light evenly. LEDs are positioned in holes 43 in opposed elongate side edges 40 and 42. The panel provides a colored lighted background for the LCD characters. "The color of light is established by the LED's 38 or by the color of the piece of plastic material used to make the panel 20" (column 4, lines 66-68).

Circuit board, LEDs, diffuser, and LCD panel

The examiner has interpreted claim 10 in such a way to find that Bournay meets the claim limitations for the circuit board and the arrangement of circuit board, LEDs, diffuser, and LCD panel. Although the examiner's interpretation is somewhat strained, appellant's arguments (Brief, page 6) fail to show that the examiner erred with respect to these limitations. The examiner reads the "circuit board" of claim 10 on the margins 48 and 50 of the panel 20 in Bournay. We agree that the term "circuit board" broadly encompasses any structure for mounting electrical components; it is a broader term than a

"printed circuit board." Accordingly, panel 20 serves both as a circuit board and a diffuser. The panel 20 is mounted to the rear of the LCD panel, as claimed. Claim 10's language that "said LEDs are in spaced relation to said smoke screen diffuser to define an enclosed convity [sic, cavity]" requires some explanation because the LEDs are mounted in the edge of the panel 20 which forms the diffuser. The diffuser is interpreted to be the central area 46 of the panel 20, not the whole panel, and the holes 43 form the cavity between the diffuser area and the LEDs mounted on the margins 48 and 50 of the panel. Claim 10 requires the LEDs to be in back of the LCD panel, not in back of the diffuser, so mounting LEDs in the side of the diffuser is consistent with the claim language.

It is noted that the claimed arrangement of circuit board, LEDs, diffuser, and LCD panel is taught in figure 3 of the admitted prior art U.S. Patent 4,959,642 to Sharples, mentioned in the specification at page 2.

Control means and display drivers

Bournay uses a conventional LCD unit (column 4, lines 10-11), but does not show the electronics which control the segments of the characters of the LCD or the power supply for the LCDs and LEDs. Bournay assumes that one of ordinary skill in the art would have known how to make and use circuitry to control the LCDs and LEDs. Cf. Paperless Accounting, Inc.

Appeal No. 95-1332
Application 08/009,430

v. Bay Area Rapid Transit System, 804 F.2d 659, 664,
231 USPQ 649, 653 (Fed. Cir. 1986), cert. denied, 480 U.S. 933
(1987) ("A patent applicant need not include in the
specification that which is already known to and available to
the public."). The motivation to add power sources and control
circuitry to Bournay arises from the fact that one skilled in
the art knew that electronics were necessary to actuate the
segments of the LCD characters and to power the LCDs and LEDs.

Schwarzchild discloses binary coded decimal (BCD) to
7 segment drivers 32-35 and a voltage source in communication
with the display drivers. This is a totally conventional way
of actuating 7 segment LCD and LED devices. See M.E. Levine,
Digital Theory and Practice Using Integrated Circuits
(Prentice-Hall, Inc., 1978), pages 328-332 (copy attached).
Therefore, we agree with the examiner's conclusion that it
would have been obvious to use drivers as taught by
Schwarzchild to drive the segments in Bournay because one
skilled in the art knew that LCD units must have display
drivers. Appellant's arguments that "the Examiner does not
explain what would motivate an artisan to make such a
combination" (Brief, page 5) and that the examiner's conclusion
"is unsupported by facts, reasoning or motivation" (Brief,
page 5) are nonpersuasive because they fail to address the

Appeal No. 95-1332
Application 08/009,430

examiner's reasoning that there must be some segment drivers to make the LCDs in Bournay work.

Yellow LEDs

With regard to the yellow LEDs, the examiner relies on appellant's admission (specification, page 1) that yellow displays have been frequently employed for displays of postage meters and concludes that it would have been obvious to use yellow LEDs in Bournay (Examiner's Answer, page 7). Appellant does not dispute this point and we agree that the use of yellow LEDs would have been obvious to one of ordinary skill in the art. We note that red, orange, yellow, and green are common LED colors. See Levine, page 329.

First power source and second power supply

With regard to the claimed "first constant current power source" the examiner finds this taught in Bournay at column 2, lines 60-64, and column 4, line 49 (Examiner's Answer, page 4). This finding is correct. With respect to the claimed "second power supply in electrical communication with each of the display drivers," the examiner finds and concludes (Examiner's Answer, page 6):

Bournay as modified does not disclose a second power supply in electrical connection with each of said display drivers.

Anglin teaches a first constant current power supply (the power supplied to the LED display is from a battery)

Appeal No. 95-1332
Application 08/009,430

and second power supply (column 1, lines 55-58; column 4, lines 18-26) for driving an LCD display.

It would have been obvious at the time of the invention to use a second power supply for the LCD as taught by Anglin in the device to Bournay as modified for the same reason Anglin does (column 1, lines 55-59).

Actually, "Bournay as modified [by Schwarzschild]" does have a "second power supply which is in electrical communication with each of the display drivers" which is the 32 Hz signal taken from the interstage point on the divider 28 in figure 3. LCDs are generally driven by alternating current. See Levine, page 332 ("LCDs do not tolerate dc voltages as it affects their life. Hence it is necessary to generate on [sic] ac voltage."); Arai, column 1, lines 13-16 ("The LCD panels are generally operated with AC driving signals, because DC voltages shorten the effective operational life of the LCD panel."). With this fact in mind, we find that one skilled in the art would have known that Bournay requires first and second power supplies, one for the LEDs and one for the LCDs, because of the different power requirements. In any case, Anglin discloses a detachable backlight unit 10 having its own batteries 16a, 16b, and 16c and thus teaches that the power supply for the LCDs and the backlight can be independent. For these reasons, we agree that it would have been obvious to provide first and second power sources to the LCDs and LEDs in Bournay.

Decoder/multiplexer and microcontroller

Neither Bournay nor Schwarzchild disclose the "decoder/multiplexer" and the "microcontroller" elements of the claimed "control means." The examiner's position is that (Examiner's Answer, pages 6-7):

Arai teaches a plurality of display drivers (306, 406), a decoder/multiplexer (304, 600) having a plurality of output pins in electrical communication with respective display drivers, a microcontroller (500) having a serial data output pin (Da, Db), a clock pulse output pin (01, 02; FIG. 1), and a plurality of output post terminals in electrical communication with the decoder/multiplexer (600, 304). The decoder/multiplexer and microcontroller to Arai provide serial data, timing signals, and a selected bias voltage to the drivers.

It would have been obvious to include a decoder/multiplexer and a microcontroller such as that taught by Arai in the conventional liquid crystal display to Bournay as modified because serial data, timing signals, and a selected bias voltages are essential to the operation of a conventional liquid crystal display.

The examiner's rejection is based on modifying "Bournay as modified," that is, Bournay as modified by Schwarzchild which contains the display drivers.

The examiner has properly given the claims the broadest reasonable interpretation. For example, claim 10 does not recite that the function of the decoder/multiplexer's "output pins in electrical communication with a respective one of said display drivers" is to enable a display driver or that the function of the microcontroller's "plurality of output terminals in electrical communication with respective input

terminals of said decoder/multiplexer" is to permit the selection of a specific driver, and the examiner has not read any limitations into the claim. Nevertheless, we disagree with the examiner's conclusion of obviousness.

First, Arai does not quite meet the decoder/multiplexer and microcontroller arrangement as claimed. The examiner's reading of the claimed display drivers on the drivers 306, the claimed decoder/multiplexer on the scanning data circuit 600 and decoders 304, and the claimed microcontroller on the timing controller 500 is the best fit of the claim onto Arai. However, the "serial data output pin" and "clock pulse output pin" of controller 500 are not "in electrical communication with each of said display drivers" as claimed, but are connected to the scanning data circuit 600, which is the decoder/multiplexer. Even if the scanning data into the decoders is considered serial data that is indirectly in electrical communication with the drivers, the clock pulses are not directly or indirectly in communication with the drivers.

Second, assuming Arai had the recited decoder/multiplexer and microcontroller structure, it is not apparent how the examiner intends to modify Bournay as modified to arrive at the claimed invention. Schwarzchild is a simple clock timing circuit and the "decoder/multiplexer" and "microcontroller" elements are not required; the drivers are directly controlled

Appeal No. 95-1332
Application 08/009,430

by the counters 29-31. A "microcontroller" and "decoder/multiplexer" are necessary only if the characters are to be independently controlled, which is not the case with the hour, minutes, and seconds characters of a clock. Thus, the teachings of Arai cannot simply be added to the combination.

Third, because the rejection modifies Bournay as modified, the motivation is more tenuous even if the combination would produce the claimed subject matter. Unlike segment drivers which are required for every segmented LCD, serial data and timing signals are not essential for the operation of LCDs, as stated; the drivers could be driven by parallel inputs. Appellant admits that "port terminals 40, 41 are connected to apply serial data and clock pulses, respectively to the display drivers 20-22 in conventional manner" (specification, page 5); however, the examiner has not relied on this admission in formulating the rejection. In any case, appellant does not admit that the decoder/multiplexer and microcontroller arrangement are conventional.

Appeal No. 95-1332
Application 08/009,430

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